certain conditions zoögonidia may be produced by vaucheria, and suggests the need of careful re-examination of all the species. ——Wm. Trelease has published an interesting paper "On the Structures which favor Cross-fertilization in Several Plants" (Proc. Bost. Soc. Nat. Hist.), in which many curious facts are brought together. Three plates accompany the paper, and add much to its value.——Professor Grant Allen's paper on "The Pedigree of Wheat," republished in the *Popular Science Monthly*, for March, from *Macmillan's Magazine*, is an entertaining though rather speculative account of a possible genesis of the grasses in general, and the wheat plant in particular. The main proposition is given in the opening sentence, "Wheat ranks by origin as a degenerate and degraded lily."——A flowering plant, new to science, from North Wales, has just been described by Arthur Bennett in the *Journal of Botany*. It is a Potamogeton, and is named *P. griffithii*. As long as new species can be found in Great Britain our collectors need not despair in any part of the United States.——J. G. Baker's "Synopsis of the Genus Selaginella," now running through the numbers of the *Journal of Botany* will form, when completed, a valuable addition to our knowledge of these beautiful and interesting plants. We hope to present a summary of it when completed.——Some curious monstrosities in fungi are described and figured in the October and January numbers of *Revue Mycologique*.——We have received a set of Pacific Coast Ferns from J. G. Lemmon, of Oakland, Col., the well-known collector. Among them are many very rare and interesting species. The specimens are generous, well preserved and neatly labelled. ——The same collector is preparing for distribution sets of phanerogams, including many new species, or rare ones, from the Arizona region. Among these are *Astragalus lypoxylus* Wats., *Mimosa lemmoni* Gr., *Stevia plummeræ* Gr., *S. amabilis* Lemmon, *Erigeron lemmoni* Gr., *Gentiana microcalyx* Lemmon, *Ipomœa thurberi* Gr., *I. lemmoni* Gr., *I. cuneifolia* Gr., *Verbena arizonica* Gr., *Euphorbia plummeræ* Wats., *Microstylis purpurea* Wats., etc.—— Ravenel's Centuries VII and VIII of Fungi Americani, have been received. They contain many interesting species described or noticed in recent numbers of *Grevillea*.

ENTOMOLOGY.[1]

RAILROAD CARS AS A MEANS OF DISSEMINATING MOTHS.—Have you ever thought of the railroads as a means of disseminating Noctuidæ? Traveling more than usual the past fall and summer, I was often struck with the numbers of Aletiæ on the trains. There were probably many others on the outside fluttering at the lights or at rest upon the cars. I do not give it as of great value or by any means conclusive; but there has

[1] This department is edited by PROF. C. V. RILEY, Washington, D. C., to whom communications, books for notice, etc., may be sent.

been this season a sort of coincidence between lines of railroad and abundance of cotton worms. The northern limit of these last, so far as I could learn, in central Mississippi, was just south of Holly Springs, in Marshall county, within a breadth of some fifteen miles, five east of the railroad and eight or ten west thereof. On the Mobile and Ohio road, in the eastern part of the State, the northern limit of the worms was Baldwyn, with a western spread of eighteen or twenty miles. Between Baldwyn and Booneville, the next station to the north, is an almost desert stretch of twelve miles of low, swampy land, nearly destitute of cotton, and but one night train runs northward. On the Mississippi Central, on the contrary, there were some three regular north-bound trains at night.

Another coincidence is worthy of mention. In 1881 I could hear of Aletiæ, north of Tallahatchie, only at two points, both in this (Marshall) county. The first extended from the river northward four miles, and but a short distance east and west of the railroad. The second was four miles south of Holly Springs, on the eastern side of the track. In 1880 there were two points of propagation of Aletia north of Tallahatchie; one near Waterford, the first station, four miles north, and the other, at Holly Springs, fourteen miles north of the river. The latter was in the nearest cotton to the station, and nearly a mile east of it, the town lying to the west.—*Judge Lawrence Johnson, Holly Springs, Miss.*

Insects as Food for Man.—Mr. Max Buchner's Contributions to the Ethnography of the Bantus[1] contains the following interesting notes which show that insects are by no means despised as food by this tribe of negroes, which inhabit a large portion of Southeastern Africa.

Toward the end of the rainy season, in April, when the white ants are swarming, the conical buildings of these insects are covered with a dense matting of banana leaves, while within this cover, vessels are placed with funnel-shaped entrance. In these vessels a vast number of white ants, males and females, are caught and roasted on the spot. They are considered a great delicacy, even Mr. Buchner finding them very palatable.

A large, fat, subterranean cricket, as well as a large Coleopterous larva, living in hollow trees, are equally sought for and roasted over fire.

But it is especially a large caterpillar called "ugoungoo," which is harvested by the natives like a field crop. It is about five centimeters long, black, with yellow rings, occurs on the savannas, and "belongs perhaps to the butterfly Crenis." Whenever it appears in large numbers the negroes march out in full force from their villages, camping out for weeks in the wilderness to gather and cure the crop. After the intestines have been pressed out, the

[1] *Das Ausland*, January 8, 1883, p. 23, ff.

caterpillars are dried before the fire and rolled up in packages of fresh leaves. To a civilized taste they are most disgusting, the smell reminding one of that of our cabbage worms.

In view of this custom it seems to be strange that the Bantas refuse to eat snakes and amphibia of all sorts, even frogs and lizards not being touched by them in times of starvation.

NUMBER OF MOLTS AND LENGTH OF LARVAL LIFE AS INFLUENCED BY FOOD.—Those who have had extensive experience in rearing insects, come to appreciate the variability inherent in most species whether in characters or in habit. Hence they feel as little sympathy for those who discuss a question of habit as though this last must needs be forever fixed in some one observed direction, as for those who indulge in the hair-splitting of species on trivial grounds.

In 1876 we hatched from the egg, larvæ of both *Tenebrio molitor* and *Tenebrio obscurus*, with a view of ascertaining the number of larval molts. Experience had taught us that they are cannibalistic, so that each larva experimented with was isolated. Eggs of *molitor*, laid May 29th, hatched a few days afterwards (June 5th). One larva molted for the first time June 15th, and by May 3d of the following year (1877) had molted eleven times when it died. A second larva, hatched on the same day (June 5th), had molted twelve times by June 10th of the following year (1877), when it died. Of *obscurus*, three larvæ, which hatched April 30th, 1876, were reared to the imago state. One molted but eleven times by August 30th of the same year, became a pupa January 20th, 1877, and finally a beetle, February 7th, 1877. The other two both molted twelve times and attained the imago state February 18th and March 9th respectively. All were, as nearly as possible, under like conditions of food and surroundings, and in all cases the molt that gave the pupa is not considered among the larval molts.

Since March 13, 1879, we have kept two larvæ of that common museum pest (*Trogoderma tarsale*) in a tight tin box with an old silkworm cocoon. They were half grown when placed in the box. On November 8, 1880, there were in the box twenty-eight larva skins, all very much of a size, the larvæ having apparently grown but little. The skins were removed and the box closed again as tightly as possible. Recently, or after a lapse of two years, the box was again opened and we found one of the larvæ dead and shriveled up; but the other was living and apparently not changed in appearance. There were fifteen larva skins in the box. We cannot tell when the one larva died, but it is certain that within a little more than three and a-half years two larvæ shed not less than forty-three skins, and that one larva did not, during that time, appreciably increase in size.

We know of no observations which indicate the normal or average length of life, or number of molts in either Tenebrio or Tro-

goderma, but it is safe to assume from what is known, in these respects, of allied species, that in both the instances here referred to, but particularly in the case of Trogoderma, development was retarded by insufficient nutrition and that the frequent molting and slow growth resulted therefrom and were correlated.—*C. V. Riley.*

OVIPOSITING OF DIPLAX RUBICUNDULA.[1]—During the first week of October I had an excellent opportunity of watching the egg-laying of this handsome little dragon-fly. They were quite abundant in a small artificial pond, whose banks were of rock, extending about two feet above the surface of the water. A little before noon they appear flying over the water coupled in the peculiar manner so well known in the dragon flies. As soon as fertilization has been accomplished, and while still held together, the female begins to deposit the eggs. The pair hover close to the surface of the water, and within a few inches of the bank. In this position the female dips the extremity of her abdomen slightly into the water; then both flying forward, the abdominal end of the female is curved strongly forward so as to strike the vertical surface of the bank just at the same time as the head of the male strikes it. These movements of wetting the tip of the abdomen and depositing the eggs alternate with great rapidity. Sometimes the water is not fairly reached the first time trying; in which case the dipping is repeated. Similarly the egg-laying movements are sometimes repeated; apparently, because the first movement was not successful.

The eggs are so glutinous that they adhere very easily. The number layed with each movement varies. Sometimes there is but one; more frequently there are more. At first they are pearly white, but after a few hours they become a shining brown. The vertical wall of rock was found to be very thickly covered with them.—*Professor W. A. Buckhout, State College, Pa.*

A SMALL BELOSTOMA CAPTURES A FISH.—In examining a small stream in Dakota last August, to see whether it was passable for my buggy, I pushed aside the weeds growing at the edge of the water and saw a strange sight. A Belostoma about three-fourths of an inch long seemed to have just vanquished a fish three or four times its own length, and like a dace in form. The bug, when first seen, was on the fish near the tail. The fish, struggling feebly, turned over on its side and the bug crawled forward to its throat and apparently pierced it with its bill, and both disappeared in a thicket of fallen weeds lying in the water, whether by the slight struggles of the fish or the strength of the bug, I cannot say. All this occupied but little time, and being several

[1] Compare also the process as observed in *Perithemis domitia* and a species of Diplax in "Embryological Studies on Diplax, Perithemis," etc. By A. S. Packard, Jr. Memoirs Peabody Academy of Science, Salem, 1871.—*Ed.*

feet away, I could not see minute points distinctly. It is probable that the main struggle occurred before I disturbed them.—*J. E. Todd, Tabor, Iowa.*

MOSQUITOS VS. MALARIA.—Dr. A. F. A. King, dean of the Medical Faculty of Columbian University, recently read a paper before the Philosophical Society of Washington, D. C., in which he endeavored to sustain the thesis that malarial disease is produced through the instrumentality of mosquitos, which, by their punctures inoculate the body with the malarial poison.

While we cannot agree with Dr. King in his conclusions, it is interesting to note how ingeniously prevailing phenomena connected with malaria may be made to apply to the well-known habits of the mosquito. Dr. King presented a series of twenty statements drawn from the best medical authorities in relation to malaria and which he argued would equally apply to mosquitos. They are briefly as follows:

1. Malaria prevails most in moist and low localities.
2. It is rarely developed at a temperature below 60° F.
3. It is checked by a freezing temperature.
4. It is most virulent towards the equator and along the sea-coast.
5. It has an affinity for dense foliage.
6. Forests and woody tracts act, nevertheless, as an obstruction to its spread.
7. Atmospheric currents transport it.
8. It is developed in previously healthy places by digging up the soil or making excavations which are apt to be followed by stagnant pools.
9. Bodies of water in the line of winds that waft it, have the power of arresting it.
10. Absence of mosquitos appear to prevent malarial diseases.
11. Malaria diminishes in proportion as a country becomes more thickly settled.
12. It usually keeps near the surface of the earth.
13. It is most dangerous after sunset.
14. Persons are most exposed to it while sleeping.
15. The white race is the most sensitive to it.
16. Fire destroys it.
17. It diminishes towards the center of cities.
18. It is most prevalent in late summer and autumn.
19. It is arrested by walls, fences, hills, rows of houses, curtains or even gauze-veils or mosquito nets.
20. It spares infants more frequently than adults.

ENTOMOLOGICAL NOTES.—Mr. R. M. Lachlan having recently written on the occurrence of a marine caddis-fly in New Zealand belonging to the genus Philanisus, Dr. Hagen calls attention to the fact that in the report on the condition of the sea-fisheries of the south

coast of New England (1873, pt. 1, p. 379) he mentions a Phryganid larva, probably a Molanna, found in Menemsha bay, Mass., in connection with *Chironomus oceanicus* Pack.——The report of the Director of the (Illinois) State Laboratory of Natural History has just been received from Professor S. A. Forbes and exhibits a comprehensive plan of work, covering general natural history. The investigations into the food of fishes and of birds, and into the nature of parasitic plants and animals that are being prosecuted in this laboratory, are of the most satisfactory and thorough character, and give the laboratory preëminence in these fields. In the entomological work Professor Forbes has been ably assisted by Mr. F. M. Webster and Mr. W. H. Garman.——In his first annual report of the Ohio Agricultural Experiment Station, Director Wm. R. Lazenby makes a satisfactory showing and devotes considerable space to economic entomology. In almost every case the experience at the station with remedies for the more destructive insects accords with and corroborates that which we have placed on record.——In the Proceedings of the American Philosophical Society (vol. xx, June to December, 1882), recently issued, there are two important entomological papers. The one is Dr. S. W. Williston's "Contributions to a Monograph of the North American Syrphidæ." As the genera and species of this family occurring in the United States have never before been tabulated, this careful paper is indispensable to the student of our Diptera. The second paper is the "Revision of the Dermestidæ of the U. S.," by Dr. H. F. Jayne, accompanied by four plates, drawn and engraved by Dr. G. H. Horn. As Dr. LeConte's synopsis of that family, written nearly thirty years ago, has become incomplete by virtue of subsequent discoveries, Dr. Jayne's paper is a most welcome contribution.——Mr. Franklin Hill contributes in the *American Journal of Science* (xxv, p. 137–138) a short illustrated paper on the antenna of Meloe, referring to the well-known distortion of that organ in the male sex and explaining its use during copulation.

ZOÖLOGY.

Sudden Destruction of Marine Animals.—Professor T. Rupert Jones accounts for the manner in which a large number of marine animals have in past ages suddenly perished in their own element and been entombed: 1. (fishes) By either unusual or periodical influx of fresh water from the land; 2. By volcanic agency; 3. By earthquake waves; 4. By storms; 5. (fishes) By suffocation, when massed together in frightened shoals, or when burrowing in sand and mud and accidentally buried by other sands and mud; 6. (fishes) By being driven ashore by fishes of prey; 7. (fishes and mollusks) By too much and too little heat in shallow water; 8. (fishes and mollusks) By frost; 9. (fishes) Diseases and parasites; 10. (fishes and mollusks) Miscellaneous causes: dis-